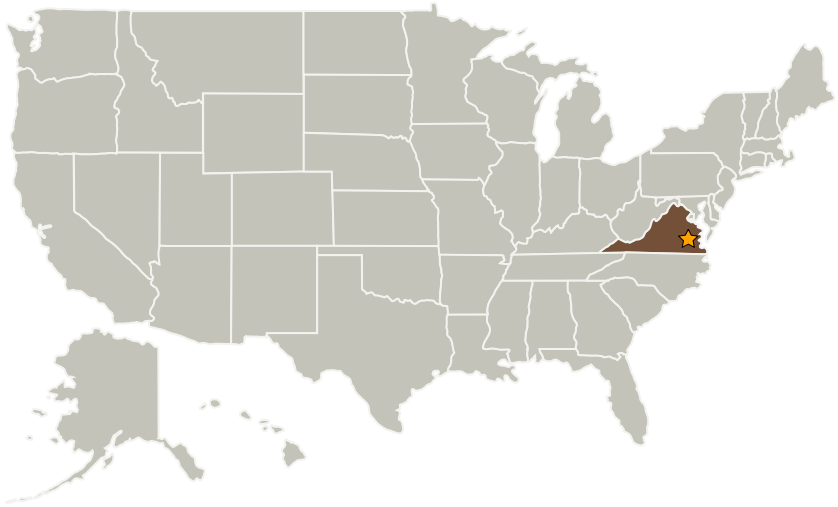
Computational Framework for Aerocapture Devices (Ballutes), Phase I

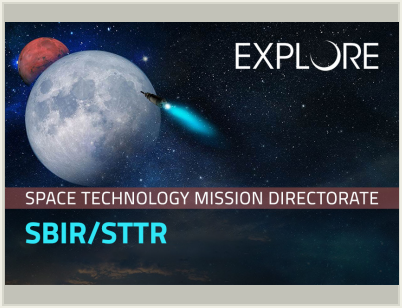
Completed Technology Project (2006 - 2006)

Project Introduction

The individual software tools that make up the analytical capabilities for the design of entry vehicles using an aero-assist/aero-capture device have been fully developed. In fact the performance of such software against the flight data has been superb, and NASA has used the results to make real-time decisions on the entry vehicles. However, the couplings among such software for estimation of weight and performance has not been developed. In part, the couplings of areas such as the fluid-structure interaction and trajectory still remain undeveloped. Lack of coupling of such software for space application has been the result of the types of structures that have been flown to date, i.e. the entry vehicles have exhibited relatively large stiffness and the TPS has been an integral part of the vehicles. However, when inflatable decelerators are becoming an essential part of the future interplanetary missions, the influence of inflation or structural displacements of an inflatable decelerator on lift and drag should be considered. Furthermore, development of a computational environment that hosts a combination of important disciplines to provide answers in a timely manner should be given a priority. A successful coupling of such software is the essential ingredient for engineering of inflatable decelerators.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Analytical Mechanics Associates, Inc.	Supporting Organization	Industry	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.1 Aeroassist and Atmospheric Entry
    - TX09.1.2 Hypersonic Decelerators